THE FUNDAMENTALS, UNIQUE FEATURES AND PERFORMANCE OF A NEWLY IMPROVED PACKED COLUMN JIG FOR PHOSPHATE PROCESSING

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The packed column jig (PCJ) is an innovative gravity separation device. PCJ was patented 20 years ago, but its commercial application only began recently after three significant improvements were implemented: 1) new design of packing and feeding system to overcome the plugging problem, 2) computer control to optimize operating parameters, and 3) semi-industrial testing to obtain the optimal design parameters. This paper discusses the fundamentals behind the superior performance of PCJ, demonstrates its unique features that result in energy and operating costs savings, and presents two industrial applications, one for separating silica from phosphate and another for separating dolomite from phosphate. The results shown in the table below are perhaps the best gravity separation results on phosphate.

Table 1. Semi-industrial Scale Testing Results Using PCJ for Silica Removal from Phosphate.

Size range, mesh	Feed grade, % P2O5	Concentrate grade, % P2O5	% P2O5 recovery
-20+40	23.10	28.88	88.46
-40+100	22.18	26.73	87.72
-100+200	21.99	28.67	84.94